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Beyond Graduation: Socio-Economic Background and Post-University Outcomes of Australian Graduates

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NON-TECHNICAL SUMMARY

Research consistently shows that higher education participation has positive impacts on individual labour market outcomes and personal wellbeing. However, few studies have examined whether graduates from low socio-economic backgrounds benefit from their university degree to the same extent as graduates from high socio-economic backgrounds do.

Our research fills this gap in knowledge using longitudinal data from two high quality, Australian datasets: the Household, Income and Labour Dynamics in Australia Survey, and the Australian Bureau of Statistics Census of Population and Housing. Using these powerful data sources, we estimate the benefits associated with obtaining a university degree and how these may differ by the social origins of graduates. We consider multiple indicators of health, wellbeing and labour market success, and examine both the short- and long-run effects of degree attainment. Socio-economic background is measured using parental occupational status. Several key findings emerge from our analyses.

First, at labour market entry, graduates from low socio-economic backgrounds earn similar wages as graduates from high socio-economic backgrounds. However, graduates from low socio-economic backgrounds are less likely to work in managerial or professional occupations, and report lower satisfaction with their job security and financial prosperity.

Second, this initial disadvantage experienced by graduates from low graduates from low socio-economic backgrounds fades over time, and is no longer visible at five years after graduation.

Third, the relative returns to obtaining a university degree are greater for individuals from low socio-economic backgrounds than individuals from high socio-economic backgrounds. That is, the improvement in outcomes for the same individuals after relative to before completing a degree is larger for individuals from low socio-economic backgrounds. This pattern of effects applies more strongly to mental health outcomes.

Our findings carry important implications for policy and practice. First, they highlight the role of higher education in mitigating socio-economic inequalities in the contemporary Australian context. Second, they suggest that additional assistance or guidance might be needed to facilitate transitions into the labour market for graduates from low socio-economic backgrounds.

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ABSTRACT

Research consistently shows that higher-education participation has positive impacts on individual outcomes. However, few studies explicitly consider differences in these impacts by socio-economic background (SEB), examine graduate trajectories over the long run, or focus on non-labour outcomes. We address these knowledge gaps by investigating the short- and long-term socio-economic trajectories of Australian university graduates from advantaged and disadvantaged backgrounds across multiple domains (labour market, social capital, wellbeing). We use high-quality longitudinal data from two sources: the *Household, Income and Labour Dynamics in Australia Survey* and the *Australian Longitudinal Census Dataset*. Results indicate that low-SEB graduates experience short-term post-graduation disadvantage in employment and occupational status (but not wages). They also experience lower job and financial security up to five years post-graduation. Despite this, low-SEB graduates benefit more from higher education in relative terms; that is, university education improves the situation of low-SEB individuals to a greater extent than it does for high-SEB individuals.

Keywords: higher education; non-labour outcomes; longitudinal trajectories; panel data; Australia

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Background

The benefits of attaining tertiary-level educational qualifications are well documented. First, individuals who have completed tertiary education generally enjoy better labour-market prospects. For example, across OECD countries 7% of tertiary-educated adults aged 25-34 year-olds are unemployed, compared to 9% for those with upper-secondary and post-secondary qualifications, and 17% of those who did not complete upper-secondary education (OECD 2017). In Australia, the focal country in this study, employment rates are substantially higher for individuals holding postgraduate (82%) and bachelor (80%) degrees than for individuals without post-school qualifications (54%) (ABS 2017a). Further, this gap has been forecasted to grow over the next 5 years (Australian Government Department of Jobs and Small Business 2018).

Tertiary-education graduates are also more likely to receive higher wages and work in more prestigious occupations, a pattern that has been documented for OECD countries overall (Desjardins and Lee 2016), and specific countries including the US (Card 1999; Hauser, Warren, Huang, and Carter 2000; Heckman, Humphries, and Veramendi 2016), the Netherlands (Van der Velden and Wolbers 2006) and Australia (Cassells, Duncan, Abello, D'Souza, and Nepal 2012; Daly, Lewis, Corliss, and Heaslip 2015). In Australia, the estimated lifetime earnings of an individual with a postgraduate degree are AU$3.17 million, compared to AU$1.74 million for an otherwise equal individual who had not completed secondary education (Cassells et al. 2012). The positive outcomes associated with tertiary education are not confined to the labour market, with substantial research documenting positive influences on a range of non-labour market outcomes (Oreopoulos and Salvanes 2011), including mental health (Heckman, Humphries, and Veramendi 2017), general health (Cutler and Lleras-Muney 2008; Duke and Macmillan 2016), and subjective wellbeing (Easterbrook, Kuppens, and Manstead 2016; Oreopoulos and Salvanes 2011).[1]

Because of this, sociologists have long been interested in the social patterning of access to and completion of higher education, as well as in how the benefits of higher-education participation differ across social groups (see e.g. Hout 1988, 1994; Torche 2011). Of key importance has been the role of socio-economic background (SEB), as its associations with education are

[1] Although negative associations between educational attainment and subjective wellbeing have also been reported (see e.g., Clark & Oswald 1996; Headey & Wooden 2004).

pivotal to the sociological study of social mobility and equality of opportunity. This paper contributes to the Australian and international literature in several ways. First, it expands the focus from employment outcomes to broader measures of health and wellbeing—hence providing a more comprehensive picture of the benefits of education participation. Second, it examines post-graduation trajectories in outcomes over time using longitudinal data and methods—thereby offering a better view into the short- and long-term outcomes of different groups of graduates.

Theoretical framework

In this section, we draw on different theories to derive testable hypotheses about the relationship between graduate SEB and the benefits of tertiary education. First, we discuss mechanisms that predict equal benefits of higher-education attainment for graduates with different social backgrounds – which we label 'levelling forces'. Second, we discuss mechanisms predicting fewer returns to higher education amongst low-SEB than high-SEB graduates – which we label 'stratifying forces'.

Levelling forces

Three broad theories lead to the prediction that low-SEB graduates will benefit from degree attainment to a similar extent as high-SEB graduates: human capital theory, signalling theory and rational action theory.

In Becker's seminal work, human capital investments *"improve the physical and mental abilities of people [that] raise real income prospects"* (Becker 1962, p.9). University participation is a key mechanism whereby people learn new knowledge and skills and, in turn, increase their labour-market productivity. Within this framework, the returns to higher-education participation stem from the increased labour-market productivity of university graduates. Accordingly, studies have documented causal effects of tertiary education participation and attainment on a range of outcomes, with the effects of university education being driven by cognitive and non-cognitive skills (see e.g., Heckman et al. 2016).

Critics of human capital theories have pointed out that information asymmetry between employers and job seekers means that employers may be unable to assess the human capital levels of job applicants (Bills 2003). In this scenario, signalling theory poses that employers deal with imperfect information on the productivity of prospective employees by taking their

years of schooling as a 'signal' of productivity (Spence 1973; Stiglitz 1975). The literature on 'sheepskin effects' points more specifically to educational credentials (e.g., a university diploma) instead of years of schooling as the key marker of productivity (Hungerford and Solon 1987). As a result, educational credentials are of critical importance in structuring access to high-status, high-wage jobs (Gibson 2000; Jaeger and Page 1996). From this prism, employers should not differentiate between low-SEB and high-SEB applicants in their hiring practices, so long as they have attained commensurate levels of education.

The arguments discussed so far can also be extended to apply to personal outcomes beyond the labour market (e.g., health and wellbeing). Possible mechanisms driving the well-documented associations between education and health include improved healthcare access and treatment due to increased income, better processing of health-related information and better lifestyle choices due to enhanced cognitive capacities, and stronger social networks with other university graduates (Hartog and Oosterbeek 1998; Cutler and Lleras-Muney 2008; Desjardins 2008; Oreopoulos and Salvanes 2011; Heckman et al. 2016). Based on this reasoning, we would expect the health returns to tertiary education to be similar for low-SEB and high-SEB graduates.

Selection arguments based on rational action theory point to a similar set of theoretical expectations. For instance, Goldthorpe (1996, 2014) noted that the relative costs of attending university are higher for low-SEB than high-SEB individuals. Therefore, low-SEB individuals weigh the potential costs and benefits of higher-education participation more carefully than their high-SEB counterparts (Flaster 2016). Only those low-SEB individuals that appear to have the highest chances of success, most notably though demonstrating excellent academic aptitude, choose to pursue higher education. These positively-selected low-SEB individuals are likely to accrue cognitive and non-cognitive skills from university participation at similar rates as their high-SEB peers.

Altogether, human capital, signalling and rational action theory all suggest that:

Hypothesis 1: Low-SEB graduates will achieve similar post-graduation outcomes as high-SEB graduates.

Stratifying forces

Several theories predict differences in the post-graduation socio-economic trajectories of low-SEB and high-SEB individuals, including social capital (Coleman 1988) and cultural capital (Bourdieu 1984) theories, the theory of effectively maintained inequality (Lucas 2001) and the life-course approach (Elder, Johnson, and Crosnoe 2003).

Social capital theory draws attention to the importance of individuals being able to access information channels to be able to optimally navigate social structures (Coleman 1988). In the context of post-graduate outcomes, low-SEB graduates have less developed social networks, and their networks may disproportionally comprise other relatively under-resourced low-SEB individuals (Lin 1999). Consequently, low-SEB graduates may be less able to rely on social networks to access information on the availability of suitable jobs, or to leverage such networks when navigating selection processes—e.g., via recommendations or direct referrals to prospective employers (Coleman 1988; Lin 2001; Franzen and Hangartner 2006). Similarly, the principle of homo-social reproduction within Bourdieu's (1984) cultural capital theory poses that employers are biased towards hiring individuals similar to them. This demand-side social-closure process should restrict low-SEB graduates' ability to access high-status, high-paying occupations (e.g., legal or medical professions).

The theory of effectively maintained inequality theory (Lucas 2001) posits that individuals who enjoy socio-economic advantage seek to maintain such advantage for themselves as well as their offspring. As participation in higher education becomes more common, parents with high socio-economic status increase their investments in their children so that they can differentiate themselves from other university graduates. This includes subsidizing and supporting the completion of high-status higher-education options, including the attainment of degree-level qualifications in more prestigious disciplines (e.g., medical, engineering) and more prestigious institutions (e.g., Australian Go8 institutions) (James et al., 2008). This introduces new inequalities within the population of university graduates which are clearly patterned by SEB, potentially resulting in a comparative advantage amongst high-SEB graduates in reaping off the benefits of higher-education participation.

Finally, the life-course perspective offers an additional lens with which to examine the intersections between social status and socio-economic inequalities (Elder et al. 2003). Two elements of this approach are helpful in theorising post-graduation trajectories of low-SEB and

high-SEB graduates. First, inter-relationships between life domains are important in structuring individual outcomes (Elder et al. 2003). Second, disadvantage is best conceptualised as a cumulative process that unfolds over time. Compared to acute or one-off experiences of disadvantage, repeated or chronic exposure to barriers and stressors can be more harmful to individuals' chances to succeed in different life domains (Elder et al. 2003). In our context, low-SEB graduates may be more likely to experience negative life events in domains other than employment or education (such as personal or parental health problems, family breakdown and financial difficulties) and to experience these circumstances for longer periods of time than their high-SEB counterparts (e.g., Umberson et al. 2014). Chronic and/or repeated exposure to these stressors may restrict the ability of low-SEB graduates to pursue, focus on and develop their work careers. As a result, low-SEB graduates would enjoy the benefits associated with university participation to a lesser extent than high-SEB graduates. Altogether, the theories outlined in this section all predict that:

Hypothesis 2: Low-SEB graduates will achieve worse post-graduation outcomes than high-SEB graduates.

Hypotheses 1 and 2 are thus competing hypotheses.

Theorising change over time in the relationship between socio-economic background and graduate outcomes

As described earlier, some theories predict similar outcomes for low- and high-SEB graduates, while others predict inferior outcomes for low-SEB graduates. Far from being mutually exclusive, the 'levelling' and 'stratifying' forces suggested by these different perspectives may operate concurrently. That is, university degrees may provide all graduates with the same skills and signals to employers, but *at the same time* high-SEB graduates may graduate from better universities, enjoy higher socio-cultural capital, and be less challenged in other life domains. Importantly, these forces may also be relatively more pronounced at different time points after graduation.

Previous studies suggest that social and cultural capital play a more prominent role immediately after graduation (e.g., Rivera 2012). High levels of social capital may enable high-SEB graduates to capitalise on their social networks to obtain (better) jobs more easily and quickly than their low-SEB peers (Coleman, 1988; Jackson, Goldthorpe, and Mills 2005; Lin 1999,

2001). Similarly, employers in high-status firms place more emphasis on "cultural matching" than objective productivity in their recruitment processes (see e.g., Cook, Faulconbridge, and Muzio 2012: Rivera 2012). In contrast, human capital may play a more important role over the long run (e.g., Jacob et al. 2015). If low-SEB and high-SEB graduates possess and utilise similar cognitive and non-cognitive skills, their actual job and career performance will send a stronger and more direct signal to employers to judge these graduates upon, rather than relying on their socio-economic background as a proxy.

Altogether, these arguments suggest that any less favourable initial outcomes for low-SEB graduates (such as those proposed in Hypothesis 2) should fade over time, as these graduates socialise into their work environments, learn skills on-the-job and provide their employers with opportunities to directly assess their performance. Therefore, we formulate the following hypothesis:

> *Hypothesis 3: Any differences in the post-graduation outcomes of low-SEB and high-SEB graduates will fade away over time.*

Relative returns to university education by socio-economic background

The reviewed theories have been predominantly applied to investigate *absolute* differences in outcomes between low-SEB and high-SEB university graduates. However, a separate and equally important question is whether or not low-SEB graduates gain more or less from a university degree in *relative* terms. Even if high-SEB graduates have better labour-market outcomes than low-SEB graduates, it is possible that the benefits accrued with graduation are, relatively speaking, greater for low- than high-SEB graduates.

First, low-SEB individuals and their families will on average experience less favourable objective circumstances than high-SEB graduates, as indicated for example by their financial situation or living standards. As a result, access to high-paying jobs within the graduate job market will often translate into significant improvements in income and financial prosperity amongst low-SEB graduates (Brand and Xie 2010). This may not necessarily be the case for high-SEB graduates, for whom the same employment outcomes may not represent changes in objective circumstances of a commensurate magnitude. For example, a young medicine graduate working as a doctor who comes from a family of farmers will experience more

substantial relative improvement in their circumstances than an otherwise similar medicine graduate working as a doctor who comes from a family of doctors.

Second, research on socially determined comparison benchmarks suggests that equal changes in objective circumstances may result in unequal changes in subjective perceptions of such circumstances. For example, social comparison and reference group theories predict that people compare their circumstances to those of other people within the social groups with which the person making the comparison identifies (Festinger 1954; Merton 1968). Due to poorer past conditions and experiences, individuals from disadvantaged backgrounds are likely to assess their circumstances using lower 'reference frames'. This results in people from socially disadvantaged backgrounds evaluating the same objective circumstances more favourably than those from more advantaged backgrounds (Tomaszewski and Perales 2014; Perales and Tomaszewski 2015). For many low-SEB students, obtaining a higher-education degree is likely to represent a major achievement, while for their high-SEB peers, university is often considered a 'default' option. These differences in expectations are likely to result in different relative improvements in subjective assessments of personal outcomes, such as personal wellbeing or life satisfaction.

Based on these considerations, we formulate a final hypothesis:

> *Hypothesis 4: Positive before-after graduation differences in outcomes will be larger amongst low-SEB than high-SEB graduates.*

Existing empirical evidence

Over two decades ago, Hout (1988, 1994) reported virtually no association between social origins and occupational status among higher-education graduates in the US. This finding has been interpreted as a sign of the meritocratic function of university (e.g., Breen and Jonsson 2007). However, this finding has also been interpreted as a result of selection into higher education: low-SEB individuals may be more likely than high-SEB individuals to 'drop out' at various stages of their educational trajectories prior to university, and the surviving low-SEB may not be representative of their cohort (Mare 1980, Shavit and Blossfeld 1993). More recent US studies paint a more complex picture, suggesting that the relative returns of university participation by SEB depend also on factors such as qualification level, field-of-study (Torche 2011), or occupational and industrial sorting (Manzoni and Streib 2018). For instance, Torche

(2011) demonstrated that, in the US, the economic returns to a Bachelor degree did not differ by SEB, but the returns to post-graduate degrees did.

Evidence on differences in the benefits of educational attainment by SEB has also been gathered in OECD countries other than the US. In Norway, Hansen (2001) documented that high-SEB individuals received higher economic returns to university participation than low-SEB individuals net of qualification level and field of study, with the gap being larger for income than wages. Similarly, Triventi (2013) found that European graduates in Norway, Italy and Spain whose parents had also university qualifications were more likely to have attained a high-status occupation five years post-graduation than similar graduates whose parents did not hold university qualifications. No such pattern was observed amongst German graduates. Jacob et al. (2015) examined the effect of parental education on tertiary graduates' occupational outcomes at labour-market entry and five years post-graduation in Germany and the UK, finding a comparative advantage for high-SEB over low-SEB graduates in entering higher-service occupations. This effect was stronger at labour market entry than five years after graduation—highlighting the importance of considering longitudinal associations. Collectively, this body of evidence indicates that the effect of SEB on the post-graduation outcomes of university graduates depends on institutional and country context (Luthra and Flashman 2017), the level of the attained qualification, the specific outcome considered, and the time point at which an outcome is measured.

The relative benefits of obtaining a university degree remain under-researched. A rare example is provided by Brand and Xie's (2010) study, which drew on US data from the 1979 National Longitudinal Survey of Youth and the Wisconsin Longitudinal Study and found that low-SEB graduates benefit more from higher education than high-SEB graduates in terms of their earnings. However, the authors reached this conclusion through between-group comparisons of low- and high-SEB individuals with and without university degrees, rather than change over time for the same individuals before and after degree attainment.

There is also little research on the post-university outcomes of low-SEB and high-SEB graduates in Australia, despite equity in higher education being a salient policy issue in the country (see e.g., Harvey, Burnheim, and Brett 2016; National Board of Employment Education and Training [NBEET] 1996). Notable exceptions include recent studies by Edwards and Coates (2011), Richardson and colleagues (2016), and Li, Mahuteau, Dockery, and Junankar (2017). Using 2014 Australian Graduate Survey data, Richardson, Bennett, and

Roberts (2016) found that low-SEB graduates were less likely than high-SEB graduates to be in employment four to six months post-graduation. However, using 2010-2014 Australian Graduate Survey data linked to confidentialised unit-record data from four anonymous universities, Li and colleagues (2017) found no significant differences. Edwards and Coates (2011) focused on labour-market outcomes five years post-graduation using data from the 2008 Graduate Pathways Survey. Their results showed that low-SEB and high-SEB graduates had similar rates of further study participation, employment, work in a professional/managerial occupation, and similar median annual salaries. Despite their timeliness and relevance, these pioneer Australian studies also suffer from significant limitations. Particularly, they focus on a small number of labour-market outcomes (notably, employment and wages) and on short-term and/or single-point assessments of graduate outcomes. This study addresses these shortcomings.

Data

To test the research hypotheses we leverage data from two authoritative sources: the Australian Census Longitudinal Dataset (ALCD) and the Household, Income and Labour Dynamics in Australia (HILDA) Survey. These two datasets have complementary strengths, and collectively they allow us to provide a thick description of the post-graduation outcome trajectories of Australian university graduates. These two sources of data are described below.

The Australian Census Longitudinal Dataset

The Australian Census of Population and Housing (the Census) is undertaken by the Australian Bureau of Statistics (ABS) and takes place every 5 years, collecting information from the whole of the Australian population (ABS 2017b). Census data contain information on population characteristics, including income, educational participation and educational attainment, at the individual and household levels. To evaluate the short-term labour-market outcomes of recent university graduates we analyse data from the ACLD, a longitudinal extension of the Census (ABS 2018a). The ACLD 2011-2016 panel is a linked dataset that combines information from two consecutive censuses (2011 and 2016) for a 5.7% random sample of the Australian population in 2011. Of the 1,221,057 records selected from the 2011 Census, 76% were linked to 2016 records. The majority of these records (72.7%) were linked using deterministic matching based on personal and demographic characteristics, with the remainder being linked

by probabilistic matching (for details, see ABS 2018b). This resulted in 927,520 linked records. The false link rate in this process was estimated at 1.4% (ABS 2018b).

We focus on a sample of young people aged 15-17 in 2011 and 20-22 in 2016 (*n*=48,399). This allows capturing socio-economic background information when cohort members attended secondary education in 2011, as well as early employment post-university destinations in 2016. We then restricted the sample to those young people who completed a Bachelor degree between 2011 and 2016 (*n*=3,040). ACLD data were extracted using an online tool made available by the Australian Bureau of Statistics (*TableBuilder*; ABS 2018e). This tool applies certain procedures to preserve confidentiality and anonymity, and these tend to reduce sample size as the number of variables or categories utilised increases (see ABS 2018e). The final analytic sample varies depending on the outcome variable of interest, ranging from 3,023 individuals (employment) to 1,207 individuals (weekly income for individuals in full-time employment). The age of the selected cohort of young people (15-17 years in 2011) means that cohort members are observed at ages 20-22 years in 2016. Hence, the outcomes for most of these young people are observed up to two years post-graduation (OECD 2017). The advantages of ACLD are its reliability, robustness and large sample size to study small subpopulations. Further, due to the almost universal population coverage in the Census, sampling error is minimal. Its disadvantages include the limited scope of the information collected (which restricts our analysis to labour-market outcomes) and the relatively short-term timeframe post-graduation (up to two years).

The Household, Income and Labour Dynamics in Australia (HILDA) Survey

The Household, Income and Labour Dynamics in Australia (HILDA) Survey is an annual household panel survey covering the period 2001-2016, which contains rich information from a sample of individuals aged 15 and older living in Australia. The initial HILDA Survey sample is largely representative of the Australian population in 2001. Exceptions include individuals living in remote areas and the institutionalised population, who were not sampled. The HILDA Survey data are collected using a complex, multi-stage sampling strategy at the household level, and a mixture of self-complete questionnaires and computer-assisted face-to-face interviews. Sample sizes range between 12,226 and 17,400 individuals across the 16 HILDA Survey waves. For further details on the structure and properties of the HILDA Survey see Watson and Wooden (2012) and Summerfield et al. (2017).

Pooling all HILDA Survey waves we obtained a sample of 12,074 observations from 1,105 individuals who (i) were observed at least twice and (ii) obtained a Bachelor degree during the life of the panel. This sample is used to examine the differences before/after attaining a degree on health and wellbeing outcomes. It will be referred to as the *before/after sample*. To examine trends in outcomes post-graduation, we exclude those observations prior to individuals obtaining their degrees (7,076 observations dropped). This yields a subsample of 4,998 observations from 935 individuals. This will be referred to as the *trajectory sample*. Of note, we do not exclude individuals with information in some but not all of the outcome variables. Hence, the final analytic numbers will depend on the outcome under consideration.

The use of the HILDA Survey brings distinct advantages to this study. First, in addition to capturing a range of labour-market outcomes, the HILDA Survey collects also rich information on a number of health and subjective wellbeing outcomes, such as physical and mental health and satisfaction with various aspects of life. Second, the HILDA Survey's panel structure allows us to examine how post-graduation outcomes evolve over a long time period—up to 15 years since degree attainment. It also allows us to compare the outcomes of the same individuals before and after they obtain an undergraduate university degree. A disadvantage of the HILDA Survey is its comparatively small sample size for the population of interest, as only 1,105 individuals are observed to graduate from university over the life of the panel.

Measures

Socio-economic background

In both datasets we use information on parental occupation to operationalize SEB. In ACLD, we extract information about the occupational status of parents co-residing with our sample of young people in 2011. Young people in households in which at least one parent worked in a managerial or professional occupation were considered to be 'high-SEB', and young people in households where no parent worked in a managerial or professional occupation were considered to be 'low-SEB'. In the HILDA Survey, paternal and maternal occupation information was captured using annually-collected respondent-reported retrospective data pertaining to when the respondent was 14 years of age. Young people in households in which at least one parent worked in a managerial or professional occupation qualified as 'high-SEB', and young people in households where no parent worked in such occupations qualified as 'low-SEB'. In both datasets, Managerial/professional occupations are those in codes 1 and 2 of the

Australian and New Zealand Standard Classification of Occupations (ANZSCO) 2006 at the 1-digit level of aggregation (major group) (ABS 2006).

Outcome variables

Four labour-market outcome variables are used in ACLD analyses. Employment status is captured through a binary indicator taking the value 1 if the individual was employed (all employment types)[2] and the value 0 if the individual was not employed (including unemployment and not in the labour force). Employment sector is captured by a binary indicator taking the value 1 if the individual worked in the private sector (including community organisations) and the value 0 if the individual worked in other sectors (including local, state and national government)—non-employed individuals score missing values in this variable. Work in a managerial/professional occupation is denoted by a binary variable taking the value 1 if the individual worked in a managerial or professional occupation (defined as for the parents above), and the value 0 if the individual worked in another occupation—again, non-employed individuals score missing values in this variable. Finally, high income is captured through a binary variable taking the value 1 if the individual's gross individual weekly income was over AU$1,250 per week,[3] and the value 0 otherwise—about 17% Bachelor degree holders in full-time employment.

In the HILDA Survey analyses, we focus on four outcome variables pertaining to labour-market circumstances, health and wellbeing. Hourly wages are generated by dividing current weekly gross wages and salary from all jobs by weekly hours usually worked in all jobs. The resulting figure is adjusted to 2016 prices using the Consumer Price Index. To correct for a right-skewed distribution, in regression models we use the natural log of hourly wages. Job security satisfaction is determined from a question asking participants about their satisfaction with job security on a scale from 0 (totally dissatisfied) to 10 (totally satisfied). Mental health is captured using the mental health subscale of the SF-36, a 5-item additive scale with transformed scores ranging from 0 to 100 (Ware and Sherbourne 1992). Financial prosperity is based on a question asking participants to rate their *"prosperity given current needs and financial responsibilities"* using the following response options: 1=Prosperous, 2=Very

[2] This includes owner managers of incorporated and unincorporated enterprises, employees not owning an enterprise and contributing family workers.

[3] This threshold was chosen to identify a small—but not too small—proportion of top income earners. Given that income information in the Census is banded, alternative thresholds of AU$1,000 & AU$1,500 but would have resulted in too many (46%) of too few (5%) individuals in the top-earning group within our sample.

comfortable, 3=Reasonably comfortable, 4=Just getting along, 5=Poor and 6=Very poor. In regression models, we treat this as a continuous-level variable.

Control variables

In multivariate models we control for a parsimonious set of potential confounders. In ACLD analyses these include gender (male; female), residence in a regional or remote area based on the Remoteness Area classification of the Australian Statistical Geography Standard, ABS 2018c), and an indicator of socio-economic disadvantage of the area in which the respondent resides based on the lowest quintile of the Index of Education and Occupation of the Socio-Economic Indexes for Areas (ABS 2018d). All of these were measured in 2011. In the HILDA Survey, controls include time-varying variables capturing respondents' age (in years), gender (male; female), attainment of a postgraduate qualification (attained; not attained) and partnership status (partnered; not partnered). When modelling health and wellbeing outcomes in the HILDA Survey, we also control for employment status (employed; not employed).

Tables 3 and 4 present descriptive statistics for all analytic variables.

Analytic approach

ACLD analyses

Analyses of ACLD rely on cross-sectional logistic regression models of the following form:

$$ln\left(\frac{p(EO)}{1-p(EO)}\right) = SEB\beta_1 + C\,\beta_2 + e \qquad (1)$$

where *EO* is a given employment outcome measured in 2016, SEB is a binary indicator for low SEB, C is a vector of control variables, the βs represent coefficients or vectors of coefficients to be estimated, and *e* is the usual random error in regression. The key model coefficient is β_1l, which gives the predicted difference in employment outcomes between high-SEB and low-SEB individuals. To facilitate the interpretation of results, we present average marginal effects.

HILDA Survey analyses

Two sets of analyses are executed using the HILDA Survey: one examining long-term post-graduation trajectories in outcomes and one examining changes in a series of outcomes before and after individuals obtain a university degree. To track the post-graduation trajectories of low- and high-SEB graduates, we fit growth models (Singer and Willett 2003: Chapter 8). These models are useful to determine the evolution of an outcome with time elapsed since a given event. In our case, the event is graduation from an undergraduate university degree, and the outcome are different variables capturing health, subjective wellbeing and labour-market circumstances. Our growth models take the following form:

$$HW_{it} = YSG_{it}\beta_{1i} + SEB_i\beta_2 + (YSG_{it} * + SEB_i)\beta_3 + C_{it}\beta_4 + u_i + e_{it} \quad (2)$$

where *i* and *t* denote individual and time; *HW* is an outcome variable capturing a given dimension of health and subjective wellbeing, *YSG* is a time-varying continuous variable capturing the number of years since graduation (ranging from 1 to 15), *SEB* is a time-constant binary indicator of low-SEB; *C* is a vector of time-changing control variables, the *β*s represent coefficients or vectors of coefficients to be estimated, *e* is the usual random error in regression, and *u* is an individual-specific random intercept capturing unobserved effects. The interaction effect between *YSG* and *SEB* (i.e., β_3) is the parameter of key interest, as it gives the differences in post-graduation trends in outcomes between low-SEB and high-SEB graduates. In some specifications we used a polynomial (quadratic) specification for the *YSG* variable (and its interaction with low-SEB) to capture non-linear trends since graduation. We do this when its addition significantly improves the model fit.

Our second set of HILDA analyses compares the outcomes of individuals before and after attaining an undergraduate university degree. Using the HILDA Survey, we can ascertain when an individual graduates by comparing his/her highest educational qualification at a given wave (time *t*) and the previous wave (time *t*-1). Based on this comparison, we first derive a dummy variable capturing the time at which the highest educational qualification recorded in the data moves from any qualification lower than a degree at time *t*-1 into 'undergraduate degree' at time *t*. We then create an additional dummy variable (*D*) that distinguishes all observations prior to graduation (value 0) and all observations subsequent to graduation (value 1). This variable is then interacted with the dummy variable capturing the low-SEB for use in fixed-effect panel regression models. These models compare the health and subjective wellbeing of

the *same individuals* before and after they obtain their degree. In practice, the fixed-effect model is estimated by regressing deviations in person-specific means in the outcome variable on deviations in person-specific means in the explanatory variables (Allison 2009). An initial version of our model can be formally represented as:

$$HW_{it} - \overline{HW_i} = (D_{it} - \bar{D}_i)\beta_1 + (C_{it} - \bar{C}_i)\beta_2 + (e_{it} - \bar{e}_i) \quad (3)$$

where all notation is as for Equation (2) above. Because fixed-effect models are estimated using within-individual change over time, they cannot accommodate time-constant predictors. However, they are fit to accommodate interactions between time-constant and time-varying predictors (Allison, 2009). Our key interest is in one such interaction, namely that between low-SEB (time constant) and attainment of a degree (time varying). Hence, the models we actually fit are as follows:

$$HW_{it} - \overline{HW_i} = (DL_{it} - \overline{DL_i})\beta_1 + (DH_{it} - \overline{DH_i})\beta_2 + (C_{it} - \bar{C}_i)\beta_3 + (e_{it} - \bar{e}_i) \quad (4)$$

Where *DL* and *DH* represent the attainment of a degree by low-SEB and high-SEB individuals, respectively. A comparison of the estimated β coefficients on these two terms via Wald tests is thus of key interest, providing the requisite evidence of whether or not degree attainment impacts the outcomes of low-SEB and high-SEB individuals at the same rate.

Results

ACLD: Comparison of outcomes after degree attainment

We first discuss the results of the ACLD analyses, which relate to income and labour-market outcomes around one year post-graduation (Table 2). Consistent with Hypothesis 2, the results yield evidence of poorer outcomes for low-SEB compared to high-SEB graduates concerning employment (mean high-SEB: 82%, mean low-SEB: 78%), employment in the private sector (mean high-SEB: 82%, mean low-SEB: 78%) and employment in a managerial/professional occupation (mean high-SEB: 52%, mean low-SEB: 44%). Results from *t*-tests indicate that all of these differences are statistically significant. As an exception, the proportion of high-income earners is not statistically significantly different by SEB (mean high-SEB: 16%, mean low-SEB: 17%, *p*: 0.73).

Table 1. Descriptive statistics of ACLD 2011-2016 data

	%	Range	Obs.	Population
Outcomes				
Employed	80.1%	0-1	3,023	...with a Bachelor degree in 2016
Works in private sector [a]	80.2%	0-1	2,407	...with a Bachelor degree & in employment in 2016
Works in professional/managerial occ. [a]	48.1%	0-1	2,429	...with a Bachelor degree & in employment in 2016
Weekly income of $1,250 or more [b]	16.7%	0-1	1,207	...with Bachelor degree & in full-time employment in 2016
Key predictor				
High SEB	51.4%	0-1	3,023	People aged 15-17 years in 2011 and with Bachelor degree in 2016
Controls				
Female	61.6%	0-1	3,023	People aged 15-17 years in 2011 and with Bachelor degree in 2016
Regional/remote	17.8%	0-1	3,023	People aged 15-17 years in 2011 and with Bachelor degree in 2016
Low SEIFA	9.2%	0-1	3,023	People aged 15-17 years in 2011 and with Bachelor degree in 2016

Notes: ACLD 2011-2016, unweighted data extracted using TableBuilder in June 2018. Statistics presented relate to the sample of people aged 15-17 in 2011 who had a Bachelor degree in 2016.

[a] Only people in employment in 2016.

[b] Only people in full-time employment in 2016

Table 2. Descriptive analyses of ACLD data

	Employed	Worked in private sector	Worked as manager or professional	Weekly income >= $1,250
Low-SEB	78.2%	78.4%	44.2%	17.0%
High-SEB	81.9%	81.9%	51.7%	16.3%
t-test (*p*-value)^	0.012	0.029	>0.001	0.729
n (individuals)	3,023	2,407	2,429	1,207

Notes: ACLD 2011-2016, unweighted data extracted using TableBuilder in June 2018. Two-sample *t* tests with unequal variances.

Table 3. Results from logistic regression models of ACLD data (average marginal effects)

	Employed [a]		Worked in private sector [b]		Employed as manager or professional [b]		Weekly income >=$1,250 [b]	
High-SEB	0.037*	0.038**	0.036*	0.026	0.075***	0.079***	-0.007	-0.015
Controls								
Lowest SEIFA quintile		-0.024		-0.041		0.022		-0.061
Regional/remote area		0.043*		-0.115***		0.070**		0.035
Female		0.085***		-0.066***		-0.002		-0.053*
n (individuals)		3,023		2,407		2,429		1,207
Pseudo R^2		0.015		0.023		0.007		0.009

Notes: ACLD 2011-2016, unweighted data extracted using TableBuilder in June 2018.

[a] In 2016; population aged 15-17 in 2011 with a Bachelor degree in 2016;

[b] Population aged 15-17 in 2011 with a Bachelor degree and in employment in 2016; * $p<0.05$;** $p<0.01$; *** $p<0.001$.

Results from logistic regression models are presented in Table 3. These largely confirm the descriptive patterns reported above. In adjusted models, high-SEB graduates enjoy better outcomes concerning employment (β=0.038, p<0.01) and work in managerial/professional occupations (β=0.079, p<0.001). Differences in the likelihood of working in the private sector (β=0.026, p>0.05) and of having a high weekly income (β=-0.015, p>0.05) were not statistically significant in the adjusted models.

HILDA Survey: Trends over time after degree attainment

Results from the first set of HILDA analyses, which compare post-graduation trends in outcomes between low-SEB and high-SEB graduates using growth models, are shown in Table 5. Due to the complexity of these analyses and the number of parameters that need to be interpreted jointly, the results of these models are easier to grasp by visually inspecting the marginal effects in Figure 1. Overall, hourly wages and financial prosperity increase with time since graduation, while mental health and job security satisfaction remain stable. Concerning differences in outcomes by SEB, the picture is mixed. The hourly wages and mental health of low-SEB graduates (red lines) appear to be on par with those of high-SEB graduates (blue lines). Differences between the two groups are not statistically significant, as can be inferred from overlapping 90% confidence intervals. Job security and financial prosperity are comparatively worse amongst low-SEB graduates in the first four years post-graduation, but their outcomes converge with those of high-SEB graduates over time. That is, consistent with Hypothesis 3, there is a 'catch up' effect for low-SEB graduates. Altogether, results from this first set of HILDA Survey analyses indicate that the personal outcomes and professional careers of low-SEB and high-SEB graduates move in similar directions and at a comparable pace after the attainment of undergraduate university qualifications.

Table 4. Descriptive statistics of HILDA Survey data

	Trajectory sample				*Before/after sample*			
	Mean/%	SD	Range	Obs.	Mean/%	SD	Range	Obs.
Degree attainment								
Observed degree attainment					51%		0-1	12,074
Years after degree attainment	4.74	3.28	1-14	4,998				
Key predictor								
Low SEB	38%		0-1	4,998	37%		0-1	12,074
Outcomes								
Mental health	73.27	15.83	4-100	4,543	73.32	15.71	4-100	11,056
Financial prosperity	4.03	0.79	1-6	4,534	4.01	0.80	1-6	
Log of hourly wages	3.47	0.41	-0.73-5.74	3,883				
Job security satisfaction	7.96	2.02	0-10	4,488				
Controls								
Age (in years)	30.41	8.23	18-74	4,998	25.67	8.66	15-74	12,074
Male	41%		0-1	4,998	40%		0-1	12,074
Postgraduate degree attained	17%		0-1	4,998	7%		0-1	12,074
Partnered	55%		0-1	4,998	34%		0-1	12,074

Notes: HILDA Survey (2001-2016).

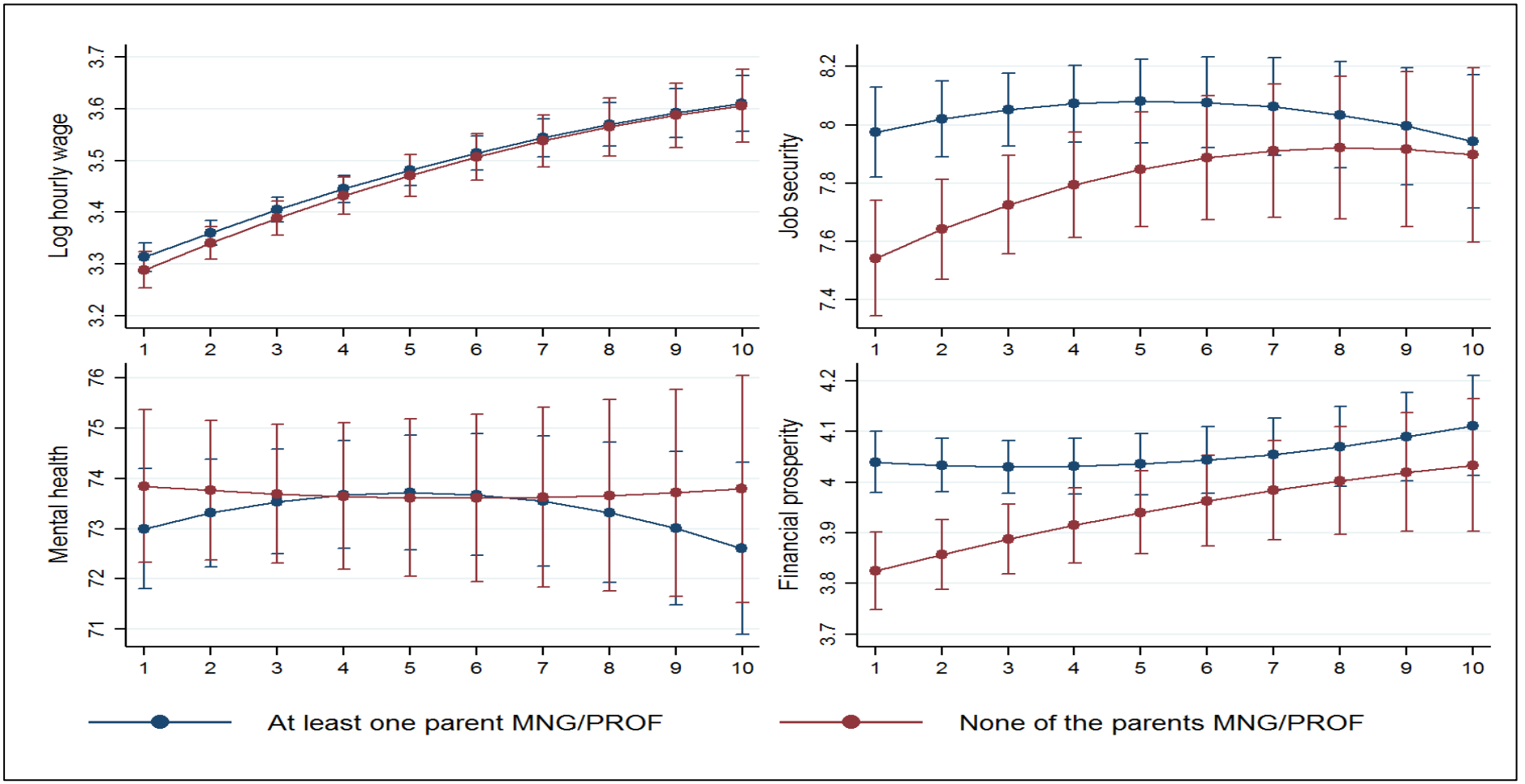
Table 5. **Results from growth models using HILDA Survey data (coefficients)**

	Log hourly wage	Job security	Mental health	Financial prosperity
Key explanatory variables				
Low-SEB	-0.00	-0.30**	-0.59	-0.26***
Years after degree	0.05***	0.07*	-0.07	-0.02
Years after degree ^{2}	-0.00**	-0.01*		0.00#
Low-SEB * years after degree	0.01		0.08	0.06**
Low-SEB * years after degree^2	-0.00			-0.00**
Controls				
Age	0.01***	-0.02*	-0.05	-0.01***

Male	0.05**	-0.05	1.21	0.02
Postgrad	-0.01	-0.08	-0.85	0.04
Partnered	0.05**	0.22**	1.55**	0.02
Constant	2.97***	8.38***	74.03***	4.46***
n (observations)	3,883	4,488	4,543	4,534
n (individuals)	875	902	899	898

Notes: HILDA Survey (2001-2016). Before/after sample. Statistical significance: # $p<0.1$, * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Figure 1. Marginal effects from growth models



Notes: HILDA Survey (2001-2016). Based on results from Growth Models presented in Table 5. Covariates held at their means and random effects at zero. Whiskers denote 90% confidence intervals.

HILDA Survey: Within-individual changes in outcomes before and after degree attainment

Results from fixed effects models comparing the relative health and subjective wellbeing returns to a university degree for low-SEB and high-SEB individuals are presented in Table 6. Attaining a degree significantly increases the mental health of low-SEB individuals (β=1.14; p<0.05) but not for high-SEB individuals (β=0.78; p>0.05). Yet, in Wald tests, the difference in differences is not statistically significant (p=0.49). Low-SEB individuals also report statistically significantly improvements in financial prosperity after attaining an undergraduate degree (β=0.09; p<0.001), which again is not the case for high-SEB individuals (β=0.02; p>0.1). The difference in the magnitude of the effects is statistically significant in a Wald test (p<0.05). Altogether, these results suggest that obtaining a university degree is associated with significant gains in mental health and financial prosperity, but these gains are restricted to low-SEB individuals. Therefore, these results provide some support for Hypothesis 4.

Table 6. Results from fixed-effect models using HILDA Survey data (model coefficients)

	Mental health	Financial prosperity
Key explanatory variables		
High-SEB	0.78	0.04
Low-SEB	1.14*	0.09***
Controls		
Age	-0.10*	-0.01**
Postgrad	0.12	-0.02
Partnered	1.36***	0.02
Employed	-0.04	0.09***
Constant	74.89***	4.10***
$\beta_{\text{Low-SEB}} = \beta_{\text{High-SEB}}$ (p-value of Wald test)	0.49	<0.05
n (observations)	11,056	11,029
n (individuals)	1,101	1,101

Notes: HILDA Survey (2001-2016). Trajectory sample. Statistical significance: $^{\#}$ p<0.1, * p<0.05, ** p<0.01, ***p<0.001.

Discussion and conclusion

In this paper, we have leveraged longitudinal data from two high-quality, longitudinal, Australian datasets—the ACLD and the HILDA Survey—to compare the absolute and relative returns to university degrees of low- and high-SEB graduates, and how these evolve with time since graduation. In doing so, we contributed to the literature on the returns to higher education,

as well as the literature on social stratification. Key study contributions included the modelling of a broad set of outcomes that go beyond labour-market indicators, considering long-run trends in post-graduation trajectories, and undertaking explicit comparisons of the absolute and relative returns to higher education.

Some of our results were consistent with the predictions of human capital, signalling and rational action theory. As posed in Hypothesis 1, we found that low-SEB graduates exhibit outcomes that are comparable to those of their high-SEB counterparts, *ceteris paribus*. This applied to outcomes such as the likelihood of working in the private sector and of having a high weekly income (ACLD) and hourly wages and mental health (HILDA Survey). This pattern of results suggests that the attainment of higher-education qualification may act as a levelling force in reducing socio-economic inequalities by individuals' social origins. Similar patterns of effects have been reported in earlier studies. For example, Hout (1988, 1994) found no significant differences in occupational status among higher-education graduates from different social classes in the US. In Australia, Li et al. (2017) found also no significant differences between low- and high-SEB graduates in the probability of being employed in a high-quality job and earnings. However, we also found support for Hypothesis 2, based on social and cultural capital, effectively-maintained-inequality and life-course theories. All else being equal, low-SEB graduates received lower returns to higher-education qualifications than high-SEB graduates for outcomes such as employment and work in a managerial/professional occupation (ACLD) and satisfaction with job security and financial prosperity (HILDA). These results echo those from previous studies in Norway (Hansen 2001), Italy and Spain (Triventi 2013), as well as previous Australian evidence (Edwards and Coates 2011; Richardson et al. 2016).

Altogether, our findings for the first two hypotheses are mixed. While these were competing hypotheses, results for different outcomes lent support to different perspectives. This heterogeneity in associations underscores the importance of considering multiple outcome variables when examining differences in the returns to education by social origin—as these are shown to differ markedly depending on the outcome considered. Further, they suggest that different mechanisms may operate to different degrees of prominence across outcomes. The fact that Hypothesis 1 was supported for outcomes such as hourly earnings and weekly income whereas Hypothesis 2 was supported for outcomes such as occupational status and perceived financial prosperity suggests the existence of multiple explanations. For instance, no

differences in income or earnings may be due to the characteristics of the Australian labour market, which is relatively highly regulated, features a high minimum wage, and is characterised by relative homogeneity of salaries for 'graduate jobs'. At the same time, high-SEB graduates may be able to use their social networks and cultural capital to their advantage. They could gain access to higher-status jobs in more prestigious occupations, which may not offer short-term benefits but may led to competitive advantages in the longer-term through clear and secure career pathways. Similarly, even though low-SEB and high-SEB graduates may receive similar salaries, the former might be more likely to be encumbered with additional financial responsibilities, such as paying off university-fee loans, or supporting their family or dependents. These may explain the comparatively lower levels of financial prosperity reported by low-SEB graduates.

One of the key contributions of this study was the consideration of longitudinal trajectories in post-graduation outcomes. Consistent with Hypothesis 3, for those outcomes in which an initial penalty associated with having a disadvantaged background was observed, this disappeared over time. This 'catch up' effect by low-SEB graduates was observed for outcomes such as satisfaction with job security and perceived financial prosperity. The initial advantage of the high-SEB group tended to fade at about four or five years after graduation. This pattern of results may indicate that the relative importance of the different stratifying and levelling mechanisms may shift over graduates' post-university life courses. Specifically, the 'closing gaps' scenario observed in our data is consistent with the proposition that social capital may play a greater role at labour market entry, while human capital may play a greater role thereafter (Lin 1999, 2001; Jacob et al. 2015). The latter could be due to an erosion in any initial differences in cognitive and non-cognitive skills by social origins through work experience (Heckman et al. 2016). Similarly, the role played by the superior social networks of high-SEB graduates may be less important in opening up job opportunities several years down the track, compared to immediately after graduation (Jacob et al. 2015). Overall, the longitudinal associations in our analyses resemble those found in previous research (e.g., Edwards and Coates 2011; Jacob et al. 2015). Based on data from the UK and Germany, Jacob et al. (2015) found that the impact of parental education on individuals' occupational destinations was stronger at labour market entry than five years after graduation. In Australia, Edwards and Coates (2011) reported similar labour-market outcomes for low- and high-SEB graduates five years after graduation.

Our final hypothesis, Hypothesis 4, posed that the *relative* returns to degree attainment would be greater amongst low-SEB than high-SEB, due to relatively more significant changes to their circumstances brought about by university attendance and completion. Consistent with this, our analyses yielded evidence that a significant within-individual before-after graduation improvement was observed for low-SEB graduates but not for high-SEB graduates. This applied to both outcomes investigated in this part of the analysis: mental health and perceived financial prosperity – although the difference was only statistically significant for the latter.

Despite the innovation and relevance of this study and its findings, some limitations must be acknowledged. These point to promising avenues for future research. First, a shortcoming of the analyses presented here is that they do not explicitly account for selection into participation and completion of university degrees. Evidence suggests that low-SEB graduates who access and complete tertiary education are highly positively selected, more so than their high-SEB peers. As explained before, this is because low-SEB individuals are more likely than high-SEB individuals to drop out at various stages of their educational trajectories prior to university (Mare 1980, Shavit and Blossfeld 1993), with only those low-SEB individuals who show superior academic aptitude pursuing higher education (Goldthorpe 1996, 2014). As a result, it is possible that the potential returns to tertiary education for low-SEB individuals who did not enter higher education would have been lower than those who did. Hence, the findings presented here may apply to the cohort of individuals who graduate, but may not be extrapolated to all individuals in the population. Future studies could aim to correct for this through the estimation of more advanced estimation approaches that explicitly account for these selection processes. Such endeavour falls out of the scope of the present study. Second, despite drawing on large and nationally representative data sources, our interest in following individuals who were observed to attain university qualifications over the observation window resulted in relatively small sample sizes. As such, we were unable to incorporate further nuances into the analyses—e.g., stratifying the models by gender or comparing undergraduate vs. postgraduate degrees. Subsequent research should leverage larger datasets—e.g., administrative or registry data on the complete population of graduates—to pursue these and other analytical pathways. Third, despite their richness, our data lacked information on other relevant factors—such as field of study and type or standing of the university attended. Further research with access to these data could elaborate and test more nuanced hypotheses about the relative returns to tertiary education of low-SEB and high-SEB graduates.

Despite these limitations, our findings carry important implications for policy and practice. Overall, they suggest that, in the contemporary Australian context, participation in higher education largely plays a levelling or equalising role in diminishing socio-economic inequalities by social origins. This is evident from the fact that graduates from low-SEB and high-SEB backgrounds report comparable and/or converging post-graduation outcomes—which applies not only to labour-market outcomes, but also to broader indicators of health and personal wellbeing. Further, low-SEB graduates benefit more from university participation in relative terms, compared with their high-SEB counterparts. However, while these findings can be read with optimism, they need to be placed hand-in-hand with those of other research painting a less rosy picture. Particularly, recent studies in Australia (Harvey et al. 2016) and internationally (e.g., Altbach, Reisberg, and Rumbley 2009; European Union 2014) show that low-SEB individuals are less likely to choose to attend higher education, face greater challenges enacting choices to attend, and remain more likely to drop out of higher-education courses. These processes represent significant barriers to equality of opportunity, and the mechanisms that produce and reproduce still need to be identified and addressed. When taken together with this pool of evidence, our findings suggest that addressing educational inequalities by SEB requires greater emphasis on access and completion than on post-graduation outcomes. However, it is still important to ensure that all graduates make a successful transition from education to employment and enjoy equal chances to succeed post-graduation – regardless of their background. Universities have a particular role to play here, and should provide not only high-quality curricula, but also training on employability skills and adequate career guidance. Strengthening the latter could help reduce the length of the time it takes for low-SEB graduates to catch up with their high-SEB peers.

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